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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,722	05/25/2004	Anthony K. Stamper	BUR920030189US1	3721

30449 7590 12/16/2005
SCHMEISER, OLSEN + WATTS
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SUITE 201
LATHAM, NY 12110

EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/709,722

Applicant(s)

STAMPER, ANTHONY K.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31 - 50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32 - 41 and 43 - 50 is/are allowed.
- 6) ☒ Claim(s) 31 and 42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on September 26, 2005 has been received and entered in the case.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 31 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (U. S. Pat. No. 6,090,698).

Regarding claim 31, Lee discloses in e.g., Fig. 1E a semiconductor device (the device in Fig. 1E), comprising:

- a substrate (102);
- a first wiring level (110b; column 4, line 30) on a top surface of the substrate (see e.g., Fig. 1E), said first wiring level (110b) comprising
 - o alternating layers of a first dielectric material (114b, 118b and 122b; column 4, lines 10 and 11) and a second dielectric material (112a, 116a, 120a and 124a; column 3, lines 56 and 57),

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- said layers of the first dielectric material (114b, 118b and 122b) comprising a plurality of layers of the first dielectric material (column 3, lines 35 – 51),
 - said layers of the second dielectric material (112a, 116a, 120a and 124a) comprising a plurality of the second dielectric material (column 3, lines 35 – 51);
- a first trench (at the place of the element 134, at the middle) and a second trench (at the place of the element 134, at the right-side) each extending through the first wiring level (110b), from a top surface of the first wiring level to the top surface of the substrate (102);
- a first layered structure (the area between the first 134 to the second 134 from the right-side) comprising a portion of all of the alternating layers (see e.g., Fig. 1E), said first layered structure being disposed between the first and second trenches and extending from the top surface of the first wiring level to the top surface of the substrate (see e.g., Fig. 1E); and
- wherein the first dielectric material (114b, 118b and 122b) within the first layered structure in each layer of first dielectric material is disposed between a first air gap (133, the first from the right-side; column 4, line 44) and a second air gap (133, the second from the right-side) within the first layered structure in each layer of first dielectric material (see e.g., Fig. 1E),
- wherein the second dielectric material (112a, 116a, 120a and 124a) within the first layered structure in each layer of second dielectric material is in direct mechanical contact with the sidewall of the first trench (at the place of the

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element 134, at the middle) and the sidewall of the second trench (at the place of the element 134, at the right-side).

Regarding claim 42, Lee discloses in e.g., Fig. 1E the first (133, the first from the right-side) and second (133, the second from the right-side) air gaps within the first layered structure in each layer of first dielectric material (114b, 118b and 122b) directly interface with an interior space of the first (at the place of the element 134, at the middle) and second (at the place of the element 134, at the right-side) trenches respectively (see e.g., Fig. 1E), and wherein the second dielectric material (112a, 116a, 120a and 124a) within the first layered structure in each layer of second dielectric material is in direct mechanical contact with the interior space of the first and second trenches (see e.g., Fig. 1E).

Allowable Subject Matter

4. Claims 32 – 41 and 43 – 50 are allowed.

5. The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach or suggest, either singularly or in combination, at least a first wiring level comprising alternating layers of first and second dielectric material, a dielectric liner conformally deposited on bottom walls and sidewalls of first and second trenches and wherein the first and second air gaps within a first layered structure in each layer of first dielectric material are respectively bounded by the dielectric liner on the sidewall of the first and second trenches. Lee (U. S. Pat. No. 6,090,698) teaches a first wiring level comprising alternating layers of first and second

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dielectric material, and the first and second air gaps within a first layered structure in each layer of first dielectric material are respectively bounded by the dielectric liner on the sidewall of the first and second trenches, but Lee does not teach a first wiring level comprising alternating layers of first and second dielectric material, a dielectric liner conformally deposited on bottom walls and sidewalls of first and second trenches and wherein the first and second air gaps within a first layered structure in each layer of first dielectric material are respectively bounded by the dielectric liner on the sidewall of the first and second trenches as set forth in claims 32 – 41 and 43 – 50.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Friday, December 09, 2005



SPE Kenneth Parker
rc2800